CLAIMS

WE CLAIM:

1. A high speed generator, comprising:

a stator; and

a rotor rotationally mounted at least partially within the stator, the rotor including:

a shaft,

at least a first and a second pole, each pole formed of at least a plurality of laminations and extending radially outwardly from the shaft, each pole spaced apart from one another to form an interpole region therebetween,

an interlamination disk disposed between at least two of the laminations, and

a coil support assembly positioned in the interpole region and coupled to the interlamination disk.

2. The generator of Claim 1, further comprising:

a fastener coupled to the coil support assembly and the interlamination disk.

3. The generator of Claim 2, further comprising:

a first opening extending through in the coil support assembly;

a second opening formed in the interlamination disk and substantially collocated with the first opening; and

a fastener extending through the first opening and into the second opening, whereby the coil support assembly is coupled to the interlamination disk.

4. The generator of Claim 1, wherein the shaft includes an inner surface and an outer surface, and wherein the generator further comprises:

a fluid flow port extending between the shaft inner surface and outer surface; and

a fluid flow passage formed in the interlamination disk, the flow passage having an inlet in fluid communication with the shaft fluid flow port and an outlet in fluid communication with the interpole region.

5. The generator of Claim 1, further comprising:

a first coil wrapped around the first pole, the first coil including an outer surface;

a second coil wrapped around the second pole, the second coil including an outer surface,

wherein the coil support assembly contacts at least a portion of the first coil outer surface and at least a portion of the second coil outer surface.

6. The generator of Claim 5, wherein the support assembly comprises:

an upper support, the upper support having a longitudinally extending main body including at least an inner surface and an outer surface, the upper support outer surface contacting at least a portion of the first and second coil outer surfaces; and

one or more upper support retainers, each retainer coupled to at least a portion of the upper support inner surface and to the interlamination disk.

7. The generator of Claim 6, further comprising:

an opening extending through each upper support retainer;

one or more openings extending through the upper support, each upper support opening substantially collocated with an upper support retainer opening;

one or more openings formed in the interlamination disk, each interlamination disk opening substantially collocated with an upper support opening; and

one or more fasteners, each fastener extending through the collocated openings in the upper support retainer, the upper support, and the interlamination disk.

8. The generator of Claim 6, wherein the first and second coils each further include an inward facing edge that substantially faces the shaft, and wherein the support assembly further comprises:

a lower support wedge coupled to the interlamination disk, the lower support wedge having a longitudinally extending main body, the main body including an outer surface having a top, a bottom, and first and second opposed sides, each of the opposed sides contacting at least a portion of different ones of the first and second coil inward facing edges.

9. The generator of Claim 8, further comprising:

an opening extending through each upper support retainer;

one or more openings extending through the upper support, each upper support opening substantially collocated with an upper support retainer opening;

one or more openings extending between the lower support wedge top and bottom surfaces, each lower support wedge opening substantially collocated with an upper support opening;

one or more openings formed in the interlamination disk, each interlamination disk opening substantially collocated with lower support wedge opening; and

one or more fasteners, each fastener extending through the collocated openings in the upper support retainer, the upper support, and the interlamination disk.

10. The generator of Claim 6, further comprising:

a plurality of interlamination disks, each of which is disposed between at least two of the laminations; and

a plurality of upper support retainers, each retainer coupled to at least a portion of the upper support inner surface and to one of the interlamination disks.

11. A rotor for use in a high speed generator, comprising:

a shaft;

at least a first and a second pole, each pole formed of at least a plurality of laminations and extending radially outwardly from the shaft, each pole spaced apart from one another to form an interpole region therebetween;

an interlamination disk disposed between at least two of the laminations; and

a coil support assembly positioned in the interpole region and coupled to the interlamination disk.

12. The rotor of Claim 11, further comprising:

a fastener coupled to the coil support assembly and the interlamination disk.

13. The rotor of Claim 12, further comprising:

a first opening extending through in the coil support assembly;

a second opening formed in the interlamination disk and substantially collocated with the first opening; and

a fastener extending through the first opening and into the second opening, whereby the coil support assembly is coupled to the interlamination disk.

14. The rotor of Claim 11, wherein the shaft includes an inner surface and an outer surface, and wherein the generator further comprises:

a fluid flow port extending between the shaft inner surface and outer surface; and

a fluid flow passage formed in the interlamination disk, the flow passage having an inlet in fluid communication with the shaft fluid flow port and an outlet in fluid communication with the interpole region.

15. The rotor of Claim 11, further comprising:

a first coil wrapped around the first pole, the first coil including an outer surface;

a second coil wrapped around the second pole, the second coil including an outer surface,

wherein the coil support assembly contacts at least a portion of the first coil outer surface and at least a portion of the second coil outer surface.

16. The rotor of Claim 15, wherein the support assembly comprises:

an upper support, the upper support having a longitudinally extending main body including at least an inner surface and an outer surface, the upper support outer surface contacting at least a portion of the first and second coil outer surfaces; and

one or more upper support retainers, each retainer coupled to at least a portion of the upper support inner surface and to the interlamination disk.

17. The rotor of Claim 16, further comprising:

an opening extending through each upper support retainer;

one or more openings extending through the upper support, each upper support opening substantially collocated with an upper support retainer opening;

one or more openings formed in the interlamination disk, each interlamination disk opening substantially collocated with an upper support opening; and

one or more fasteners, each fastener extending through the collocated openings in the upper support retainer, the upper support, and the interlamination disk.

18. The rotor of Claim 16, wherein the first and second coils each further include an inward facing edge that substantially faces the shaft, and wherein the support assembly further comprises:

a lower support wedge coupled to the interlamination disk, the lower support wedge having a longitudinally extending main body, the main body including an outer surface having a top, a bottom, and first and second opposed sides, each of the opposed sides contacting at least a portion of different ones of the first and second coil inward facing edges.

19. The rotor of Claim 18, further comprising:

an opening extending through each upper support retainer;

one or more openings extending through the upper support, each upper support opening substantially collocated with an upper support retainer opening;

one or more openings extending between the lower support wedge top and bottom surfaces, each lower support wedge opening substantially collocated with an upper support opening;

one or more openings formed in the interlamination disk, each interlamination disk opening substantially collocated with lower support wedge opening; and

one or more fasteners, each fastener extending through the collocated openings in the upper support retainer, the upper support, and the interlamination disk.

20. The rotor of Claim 16, further comprising:

a plurality of interlamination disks, each of which is disposed between at least two of the laminations; and

a plurality of upper support retainers, each retainer coupled to at least a portion of the upper support inner surface and to one of the interlamination disks.

21. The rotor of Claim 11, further comprising:

a plurality of interlamination disks, each interlamination disk spaced apart from one another and disposed between at least two of the laminations,

wherein the coil support assembly is coupled to each of the interlamination disks.

22. An interpole coil support assembly for placement in an interpole region that is formed between adjacent poles of a rotor assembly, comprising:

a lower support wedge having a longitudinally extending main body, the main body having at least first and second opposed sides, and one or more openings extending through the main body between the first and second sides;

a upper support having a longitudinally extending main body, the main body having at least an inner surface, an outer surface, and one or more openings extending therebetween;

one or more upper support retainers, each retainer having at least two side surfaces a top surface coupled between the side surfaces, a bottom surface coupled between the side surfaces, and an opening extending between the top and bottom surfaces, each side surface configured to engage the upper support inner surface; and

one or more fasteners, each fastener adapted to extend through the opening in the upper support retainer, through one of the openings in the upper support, and through one of the openings in the lower support wedge.